S2.2 *Application.* Sedans, buses, carryalls, and station wagons as specified in procurement documents used by the Federal Government, and light trucks up to 10,000 pounds G.V.W. as specified in procurement documents used by Federal agencies, shall be equipped with safety devices as specified herein. Where the requirements stated in this standard conflict with any requirement in such procurement documents, the requirements of this standard shall govern: *Provided, however,* That this provision shall not be construed to prohibit any agency of the Federal Government from prescribing, pursuant to authority other than Public Law 88-515, safety standards with requirements greater than those prescribed in Federal Standard No. 515.

S3. *Safety devices.* Safety devices shall be as specified in the detailed standards (see S4). Publications referenced in the detailed standards form a part of this standard, as applicable. The publications referred to are the issues in effect on the date of the publication of this standard in the FEDERAL REGISTER. In the case of changes in Federal Standard No. 515, references to publications therein are to the issues in effect on the date of the publication of the respective changes in the FEDERAL REGISTER unless earlier issues are specified.

NOTES: (1) *Federal specifications.* Copies of Federal specifications may be obtained from the General Services Administration at the addresses indicated in Index of Federal Specifications and Standards, which may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(2) *Code of Federal Regulations (CFR), Federal Register, and ICC Regulations.* Copies of the Code of Federal Regulations, Federal Register and ICC Regulations may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(3) *SAE publications.* Copies of SAE publications may be obtained from the Society of Automotive Engineers, Inc., 485 Lexington Avenue, New York, N.Y. 10017.

(4) *ASA standards.* Copies of ASA standards may be obtained from the American Standards Association, Inc., 10 East 40th Street, New York, N.Y. 10016.

(5) *NEA publications.* Copies of NEA publications may be obtained from the National Commission on Safety Education, National Education Association, 1201 16th Street NW., Washington, D.C. 20036.

(6) *Uniform Vehicle Code.* Copies of the Uniform Vehicle Code may be obtained from the National Committee on Uniform Traffic Laws and Ordinances, 525 School Street SW, Washington, D.C. 20024.

(7) *ASTM standards.* Copies of ASTM Standards may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

(8) *Year Book.* Copies of the Year Book may be obtained from the Tire & Rim Association, Inc., Comand Building, 34 North Hawkins Avenue, Akron, Ohio 44313.

(9) *Weight, Height, and Selected Body Dimensions of Adults.* Copies of the Weight, Height, and Selected Body Dimensions of Adults, Public Health Service Publication No. 1000, Series 11, Number 8, may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

S4. *Detailed Standards.* Detailed standards for safety devices are identified as:

No. 515/1a—Anchorages for Seat Belt Assemblies in Automotive Vehicles.

No. 515/2a—Forward Compartment Energy Absorption for Automotive Vehicles.

No. 515/3a—Instrument Panel Instruments and Control Devices for Automotive Vehicles.

No. 515/4a—Energy Absorbing Steering Control System for Automotive Vehicles.

No. 515/5a—Safety Door Latches and Hinges for Automotive Vehicles.

No. 515/6a—Anchorage of Seats for Automotive Vehicles.

No. 515/7—Four Way Flasher for Automotive Vehicles.

No. 515/8—Safety Glazing Materials for Automotive Vehicles.

No. 515/9a—Hydraulic Service Brake Systems for Automotive Vehicles.

No. 515/10—Standard Bumper Heights for Automotive Vehicles.

No. 515/11—Standard Gear Quadrant (PRNDL) for Automotive Vehicles Equipped with Automatic Transmissions.

No. 515/12a—Windshield Wipers and Washers for Automotive Vehicles.

No. 515/13a—Glare Reduction Surfaces for Automotive Vehicles.

No. 515/14a—Control of Air Pollution from Automotive Vehicles.

No. 515/15—Tires and Safety Rims for Automotive Vehicles.

No. 515/16—Backup Lights for Automotive Vehicles.

No. 515/17a—Rearview Mirrors for Automotive Vehicles.

No. 515/18—Window and Door Controls for Automotive Vehicles.

No. 515/19—Ashtrays and Lighters for Automotive Vehicles.

No. 515/20—Armrests for Automotive Vehicles.

No. 515/21—Padding for Automotive Seat Backs.

No. 515/22—Head Restraint for Automotive Vehicles.

No. 515/23—Side Marker Devices for Automotive Vehicles.

No. 515/24—Rear Window Defogger for Automotive Vehicles.

No. 515/25—Roll Bar Structure for Automotive Vehicles.

No. 515/26—Fuel Tanks and Tank Filler Pipes for Automotive Vehicles.

S5. *Provision for changes in the standard.* Section 4 of Public Law 88-515 provides for the possibility of changes in the standards established under section 2 of that act. Any person, firm, or organization wishing to propose a change in this standard after it is prescribed shall submit the detailed proposal to the Commissioner, Federal Supply Service, General Services Administration, Washington, D.C. 20405. Changes in Federal Standard No. 515 take effect for those automotive vehicles manufactured on or after one year and 90 days after the date of publication of such changes in the FEDERAL REGISTER.

[Federal Standard No. 515/1a]

ANCHORAGES FOR SEAT BELT ASSEMBLIES IN AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes the requirements and test procedures for seat belt assembly anchorages in automotive vehicles. This standard does not cover seat belt assemblies.

S2. *Application.* This standard applies to sedans, station wagons, carryalls, buses (including school buses), and light trucks up to 10,000 pounds G.V.W. Intracity type buses, stand-up, walk-in package delivery vehicles with tilt type drivers' seats, and also folding jump seats that are folded directly behind the front seat in any vehicle are excluded.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, applicable references to this standard are: Federal Specification JJ-B-185a, Interim Amendment 7, Belt, Seat, Passenger Type, Automotive; SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodations; Standards for Seat Belts for Use in Motor Vehicles, 15 CFR Part 9, issued by the Department of Commerce; Uniform Vehicle Code of the National Committee on Uniform Traffic Laws; Minimum Standards for School Buses of the National Education Association; and National Bureau of Standards (NBS) Handbook H28, Screw-Thread Standard for Federal Services.

S3.2 *Definitions.*

S3.2.1 *Anchorage.* A seat belt anchorage consists of a threaded hole, an eyebolt, or other suitable means of attachment and shall be situated in a suitable structure to receive seat belt attachment fittings and meet location and strength requirements specified.

S3.2.2 *Attachment fittings.* Attachment fittings are parts that attach the seat belt assembly to the seat belt anchorage.

S3.2.3. *Seat belt assembly.* A seat belt assembly is "any strap, webbing, or similar device designed to secure a person in a motor vehicle in order to mitigate the results of any accident, including all necessary buckles and other fasteners, and all hardware designed for installing such seat belt assembly in a motor vehicle."[1] Seat belt assemblies are described in Federal Specification JJ-B-185a, Interim Amendment 7, and referenced regulation of the Department of Commerce.

S3.2.4 *Type 1 seat belt assembly.* "Type 1 seat belt assembly is a lap belt for pelvic restraint."[1]

S3.2.5 *Type 2 seat belt assembly.* "Type 2 seat belt assembly is a combination of pelvic and upper torso restraints."[1]

S3.2.6 *Type 2a shoulder belt.* "Type 2a shoulder belt is an upper torso restraint for use only in conjunction with a lap belt as a Type 2 seat belt assembly."[1]

S3.2.7 *School bus.* A school bus is: "Every motor vehicle that complies with the color and identification requirements set forth in the most recent edition of *Minimum Standards for School Buses*[2] and is used to transport children to or from school or in connection with school activities, but not including buses operated by common carriers in urban transportation of school children:"[3]

S3.3 *General.* Anchorages shall conform to the applicable requirements in the referenced regulations of the Department of Commerce. Threads shall be in accordance with applicable requirements in NBS Handbook H28. Anchorage location shall be determined with the seat at its rearmost limit of travel.

S3.3.1 *Location of anchorages for a type 1 seat belt assembly and for the pelvic portion of a type 2 seat belt assembly.* These anchorages shall be provided for each designed seating position. Anchorages shall be spaced laterally so that the belt essentially forms a U-shaped loop when in use. The same anchorage shall not be used for both ends of a single type 1 seat belt assembly or for both ends of the pelvic portion of a single type 2 seat belt assembly. Common anchorages meeting the strength requirements in S3.4 may be used for one end of each of two assemblies. A line from this anchorage to the occupant's "H" point (as defined in SAE Standard J826) shall make an angle from the horizontal as near as practicable to 45°, as shown in figures 1, 2, and 3. Determine the location of the "H" point using SAE Standard J826. Anchorages for belts installed over the seat bottom frame rear bar shall be as shown in figure 4. The type 1 seat belt assembly used in buses shall utilize the

[1] As defined in 15 CFR Part 9.

[2] Produced and sponsored by the National Commission on Safety Education of the National Education Association.

[3] As defined in § 1-160 of the Uniform Vehicle Code.

seat for the anchorage points. Floor and wall anchorage points are permitted in buses only when there is no possible interference with the normal foot room provided or in entering or leaving the seat to the rear of the seat served by the anchorage.

S3.3.2 *Location of anchorages for the upper torso portion of a type 2 seat belt assembly and for a type 2a shoulder belt.* As a minimum, these anchorages shall be provided for each outboard seating position in sedans and station wagons, and each front seat outboard position in carryalls and light trucks. In buses, only the driver's seat need be provided with these anchorages. Excluded are vinyl or canvas top or bolted-on metal enclosure vehicles and three-wheeled utility vehicles. At least one anchorage shall be provided for the upper end of each upper torso restraint. These anchorages may be located in the seat, side or rear structure, roof, or floor, provided that the structure over which the restraint passes or to which it is fastened has been designed or reinforced to withstand the resulting load and the attached belt will comply with angle restrictions. When in use, location of these anchorages shall permit unhampered entering or leaving of any seat to the rear. The lower end of the upper torso restraint may be fastened to the pelvic portion of a type 2 assembly or to an existing inboard anchorage for a type 1 assembly. With the seat at its rearmost limit of travel, and the seat back in its rearmost driving position, the anchorages for the upper end of the upper torso restraint shall be on or rearward of the extension of the SAE two-dimensional manikin's torso line (see SAE Standard J826). An upward angle of the upper torso restraint passing from the shoulder reference point to an anchorage is desirable. If there is a downward angle of the upper torso restraint passing from the shoulder reference point to an anchorage, or to a suitable structure between the shoulder point and an anchorage, this angle shall be not more than 40° downward from the horizontal.

S3.4 *Strength.* Anchorages shall meet the strength requirements specified, when tested in accordance with S3.5. Permanent deformation of any anchorage or surrounding area is acceptable, provided there is no rupture or breakage and the anchorage does not pull loose.

S3.4.1 *Anchorages for a type 2 assembly and a type 2a belt.* Each outboard anchorage for the pelvic portion of a type 2 assembly shall withstand a force of at least 2,500 pounds. Each outboard anchorage for the upper portion of a type 2 assembly or a type 2a belt shall withstand a force of at least 1,500 pounds. A common anchorage for the inboard end of a type 1 assembly in combination with a type 2a belt or the inboard anchorage of a type 2 assembly shall withstand a force of at least 3,000 pounds. A common anchorage for one end of a center positioned type 1 assembly and either the inboard end of a type 1 assembly in combination with a type 2a belt, or the inboard end of a type 2 assembly, shall withstand a force of at least 5,500 pounds. A common anchorage for the inboard ends of two outboard pelvic belts and the inboard ends of two upper torso restraints shall withstand a force of at least 6,000 pounds.

S3.4.2 *Anchorages for a type 1 assembly.* These anchorages shall withstand a force of at least 2,500 pounds for each belt end attached.

S3.4.3 *Anchorages for a seat belt assembly attached to the seat frame.* The seat structure; seat adjusters, if applicable; and attachments shall withstand the forces specified in S3.4.1 and S3.4.2, as applicable, for all anchorages attached to the frame plus the seat inertia force. The seat inertia force shall be no less than 20 times the seat weight. Floor and seat deformation are acceptable, provided there is no structural failure or release of the seat adjuster mechanism.

S3.5 *Test procedure.* Seats shall be in place in the body of the vehicle structure. Structures giving the equivalent effect of closed doors may be substituted for doors. Apply the load at an upward angle of 10°±5° from the horizontal. As a minimum the vehicle structure shall be subjected to the simultaneous pull on all anchorages for all designed seating positions of each seat assembly. Load shall be applied toward the rear for seats facing the rear. When common anchorages are used for forward and rearward facing seats, the loads shall not be applied simultaneously. Anchorages for the upper end of the upper torso restraints may be tested independently if they are located in structural members in which no pelvic restraint anchorages are located.

S3.5.1 *Anchorage test for a type 2 assembly and a type 2a belt.* The loads specified in S3.4.1 shall be applied using either a body block set up similar to that shown in figure 5 or equivalent method.

S3.5.2 *Anchorage test for type 1 assembly.* The load specified in S3.4.2 shall be applied using either a body block similar to that shown in figure 6 or equivalent method.

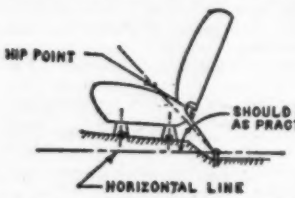


FIGURE 1.—Belt outside seat or through seat springs.

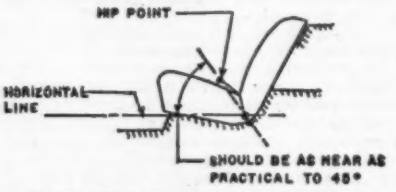


FIGURE 2.—Rear seat belt installation.

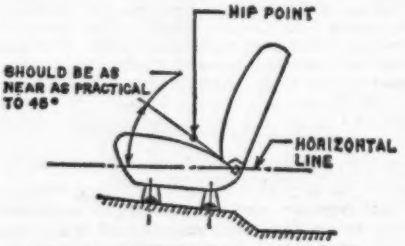


FIGURE 3.—Belt attached to seat frame.

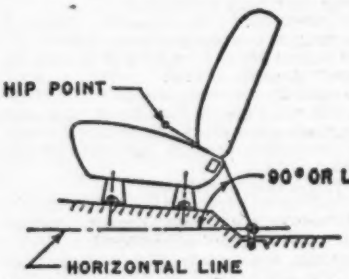


FIGURE 4.—Belt over seat crossbar.

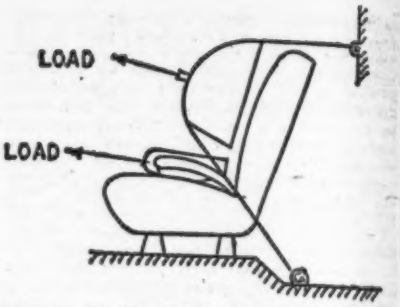


FIGURE 5.—Body block set up for combination upper torso and pelvic belt anchorages.

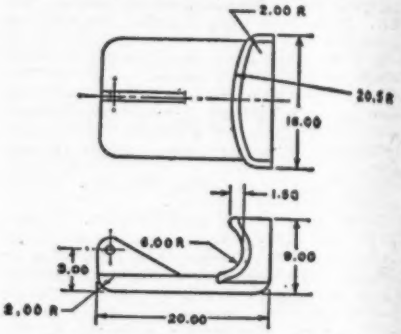


FIGURE 6.—Body block for pelvic belt anchorages.

[Federal Standard No. 515/2a]

FORWARD COMPARTMENT ENERGY ABSORPTION FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements and test procedures for energy absorption characteristics for components of automotive vehicles in the forward compartment. The forward compartment includes all areas of the instrument panel, sun visors, header, and corner "A" pillars. Construction shall afford a reasonable degree of protection for front seat occupants wearing type 1 seat belt assemblies.

S2. *Application.* This standard applies to sedan, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: Federal Standard No. 515/3a, Instrument Panel Instruments and Control Devices for Automotive Vehicles; SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation; SAE Recommended Practice J921, Instrument Panel Laboratory Impact Test Procedure and Public Health Service Publication No. 1000, Series 11, Number 8, Weight, Height, and Selected Body Dimensions of Adults.

S3.2 Injury potential shall be minimized by constructing or locating forward compartment structures to eliminate impact or to reduce the forces imposed upon front seat occupants wearing type 1 seat belt assemblies when impacting these structures.

S3.3 *Impact areas.* SAE Standard J826 forms a basis for that part of this standard pertaining to head, knee, and leg impact areas. Establish the head impact area using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point to "top-of-head" dimensions of 33 and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated

29-inch device. The head impact area is the area between the arcs formed by the "top-of-head" points with the devices placed at each designed seating position and then swung forward and also 45° to each side of the longitudinal axis. Establish the knee and leg impact areas on the doors by swinging the manikin's knees and legs 45° right and left with the seat in its rearmost position using manikins restrained by a type 1 seat belt assembly or other test device with leg dimensions of the normally seated 95th percentile male defined in Public Health Service Publication No. 1000, Series 11, Number 8. To determine impact areas in all portions of the instrument panel and doors that may be contacted, swing the manikin's knees and legs 45° right and left at each designed seating position with the manikin's "H" point moved horizontally forward 10 inches and its feet resting in their normal toe board position.

S3.4 *Location and construction.*

S3.4.1 Within the impact area, the instrument panel, constructed of or covered with force distributing cushioning material, shall expand the areas of contact and deform to conform to the performance requirements in S4.

S3.4.2 The lower portion of the instrument panel shall contain no sharp or protruding edges in the knee and leg impact areas. Within the impact areas, the panel, constructed of force distributing cushioning material, shall expand areas of contact and deform to distribute the forces and minimize injury when struck by the knees or legs. Control devices and instruments in these impact areas shall comply with the requirements of Federal Standard No. 515/3a.

S3.4.3 The sun visors shall be constructed of force distributing material or be covered by force distributing cushioning material. The sun visor mounting shall be designed and located to provide a reasonable degree of protection for the head regardless of the position of the sun visor.

S3.4.4 The roof header impact areas shall contain no sharp or protruding edges. The impact areas shall be covered with minimum 0.5 inch thick force distributing cushioning material or other material which will reduce the likelihood of injury to an occupant's head upon impact.

S3.4.5 The right and left front corner posts shall not contain any sharp or protruding edges. The impact areas of the corner posts shall be covered with minimum 0.5 inch thick force distributing cushioning material or other material which will reduce the likelihood of injury to an occupant's head upon impact. These covering materials shall be designed and placed to create a minimum loss of visibility.

S4. *Test procedures.*

S4.1 *Instrument panel.* Tests shall be in accordance with SAE Recommended Practice J921. The deceleration of the head form when impacting the instrument panel at 22 feet per second shall not exceed a maximum value of 80 gs excluding all portions of the deceleration time curve above the 80 g level of less than 1.0 millisecond duration. The applicable less than 1.0 millisecond time of duration shall be that measured at the 80 g level of the deceleration time curve.

[Federal Standard No. 515/3a]

INSTRUMENT PANEL INSTRUMENTS AND CONTROL DEVICES FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes the locations and impact performance requirements of automotive vehicle instruments and control devices to afford a reasonable degree of protection for front seat occupants wearing type 1 seat belt assemblies in the event of a collision.

S2. *Application.* This standard applies to sedans, buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W. Stand-up, walk-in package delivery vehicles with tilt type drivers' seats and three-wheeled utility vehicles are excluded.

S3. *Standard requirements.* Injury potential to occupants wearing type 1 seat belt asemblies shall be minimized by the construction, location, and mounting of control devices, instruments, and instrument bezels.

S3.1 *Applicable references.* To the extent specified herein, the applicable reference for this standard is SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation.

S3.2 *Location, construction, and mounting.*

S3.2.1 All instrument panel mounted control devices, except controls not essential to the operation of a moving vehicle, shall be located within reach of a driver wearing a type 2 or 2a seat belt assembly with a reasonable degree of slack in the upper torso portion of the belt assembly. Essential controls are the steering wheel, transmission gear selector, ignition switch, headlight switch, turn signal indicator lever, manual choke control, and windshield wiper and washer controls. Essential controls shall be readily recognizable.

S3.2.2 Except for buses, the impact area shall be established using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point (see SAE Standard J826) to "top-of-head" dimensions of 33 inches and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated 29-inch device. The impact area is the area between the arcs formed by the "top-of-head" points when each device is swung forward and also 45° to each side of the longitudinal axis through each normal designed seating position.

S3.2.3 Control devices positioned outside the established impact area or which cannot be struck due to the steering wheel, column, or shielding are not required to meet the following specifications. All other control devices shall have a contact area of not less than 1.0 square inch of flat surface with an edge radius of not less than 0.125 inch. When a force (not to exceed 90 pounds) is applied from any position defined in S3.2.2, the devices shall deflect to within 0.375 inch of the panel surface, shall be pushed flush with the panel surface, or shall be detached.

S3.2.4 Instruments and instrument bezels positioned outside the established impact area or which cannot be struck due to the steering wheel, column, or shielding are not required to meet the following specifications. Instruments and instrument bezels within the impact area and not prevented from contact as previously specified shall have an edge radius of not less than 0.125 inch and shall project not more than 0.250 inch above the surface of the panel.

S3.2.5 When mounted on the steering column within the impact area defined in S3.2.2, the end of the transmission selector lever knob shall be a relatively flat area at least 1.0 square inch. Complete penetration of the knob by the selector shaft is not permitted when a 2,500 pound load is applied to the end of the knob on the centerline of the selector shaft.

[Federal Standard No. 515/4a]

ENERGY ABSORBING STEERING CONTROL SYSTEM FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for energy absorbing steering control systems to minimize occupant injury on impact.

S2. *Application.* This standard applies to sedans and station wagons.

S3. *Standard requirements.*

S3.1 *Applicable reference.* To the extent specified herein, the applicable reference for this standard is SAE Recommended Practice J850, Barrier Collision Tests.

S3.2 *Definition.* The steering control system is defined as the basic steering mechanism in combination with its associated horn actuating machanism, trim hardware, etc., and includes any portion of the steering column assembly that may contain an energy absorber for the purpose of dissipating energy upon impact.

S3.3 The steering control system shall be designed so that when it is impacted at a relative velocity of 22 feet per second with a torso shaped body block as shown in figure 1, weighing 75–80 pounds, and having a spring rate load of 600–800 pounds per inch, it will absorb the energy of the body block. The force developed during collapse of the system shall not exceed 2,500 pounds. Load the chest of the torso shaped body block with a 4-inch wide flat contact surface so that it is 90° to the longitudinal axis of the body block, parallel to the backing plate and within 15 to 20 inches from the top of the head form. Measure the load when the flat contact surface has compressed the body block material ½ inch. The spring rate is double this load figure.

S3.3.1 When the steering wheel is the principal energy absorbing element, the load cell recording device shall be equivalent to the type shown on figure 2. It shall be installed either directly behind the wheel or in the frontal surface of the body block, with its axis of primary sensitivity in the direction of body block travel at the time of impact. The steering wheel shall be mounted to the load cell by means of an appropriate nose piece at the same angle as it is to be installed in the vehicle.

S3.3.2 When a component or components other than the steering wheel, such as the steering column, is the principal energy absorbing element or contributes substantially to the absorption of energy, the load cell shall be located between the steering wheel and the remainder of the energy absorbing system, preferably immediately under the wheel, or in the forward impacting surface of the body block.

S3.4. Other testing methods, such as high capacity acceleration facilities and anthropometric dummies, giving equivalent results, may be utilized in lieu of methods defined in S3.3.

S3.5 The steering control system shall be so designed that when the front structure of the automotive vehicle collapses during the SAE Recommended Practice J850, Barrier Collision Tests, or equivalent, at 30 miles per hour, the upper end of the steering control system shall not be displaced rearward, relative to an undisturbed point to the rear of the steering wheel position, more than 5 inches.

S3.5.1 The rearward displacement of the steering control system shall be determined under dynamic conditions during the barrier collision test, or equivalent.

S3.6 The steering control system shall be constructed so that there shall be no devices or attachments such as horn actuating mechanism, trim hardware, etc., which can catch in the operator's clothing during normal driving maneuvers.

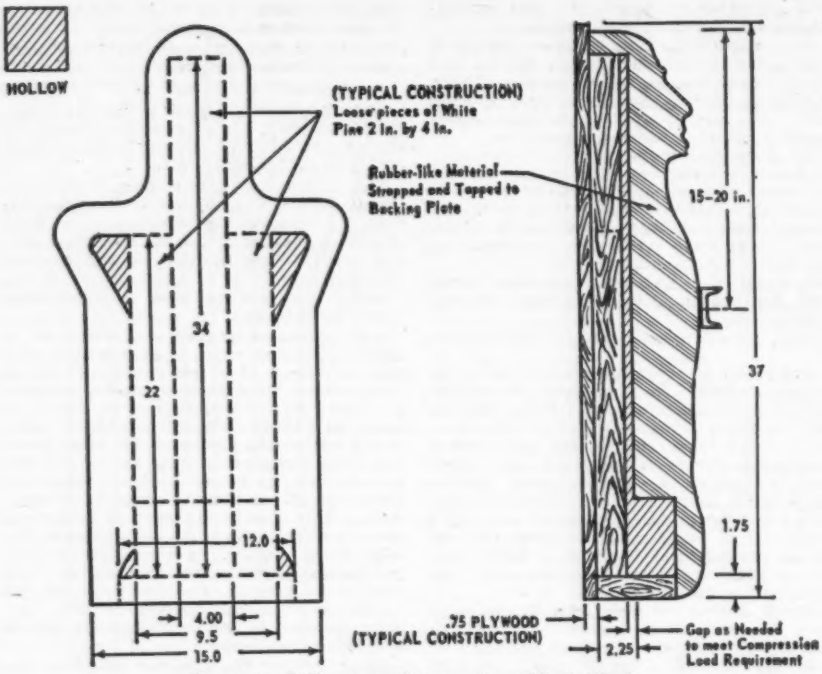


FIGURE 1.—50th percentile torso shaped body block.

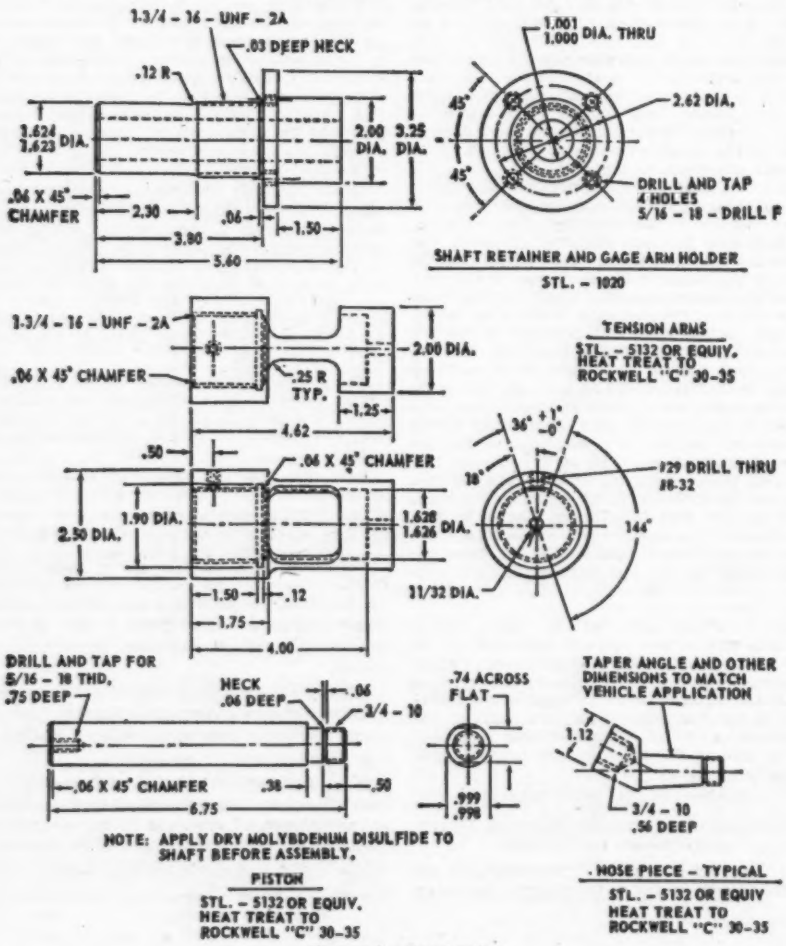


FIGURE 2.—Load cell.

[Federal Standard No. 515/5a]

SAFETY DOOR LATCHES AND HINGES FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes uniform test procedures and minimum static load requirements for automotive vehicle side door latches and hinges to minimize accidental door opening.

S2. *Application.* This standard applies to sedans, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W. Folding or cargo type doors on light trucks, and open body trucks with enclosures made of canvas, metal, wood, fiber glass, or plastic are excluded.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Recommended Practice J839b, Passenger Car Side Door Latch Systems and SAE Recommended Practice J934, Vehicle Passenger Door Hinge Systems.

S3.2 Hinges shall support the door and withstand, as a minimum, the longitudinal load and transverse load specified in S3.3 and S3.4 for the door latch and striker assembly. Each door release mechanism shall be provided with a single positive locking device not subject to accidental release. Interior or exterior handles need not be locked by this device if not operable by accidental side, rearward, or forward force.

S3.3 *Longitudinal load.* When tested as specified in S4, the door latch and striker assembly shall withstand a minimum longitudinal load of 2,500 pounds in the fully latched position and 1,000 pounds in the secondary latched position.

S3.4 *Transverse load.* When tested as specified in S4, the door latch and striker assembly shall withstand a minimum transverse load of 2,000 pounds in the fully latched position and 1,000 pounds in the secondary latched position. For vehicles equipped with sliding doors, each track and slide combination shall withstand the transverse loads specified for latches and hinges when the door is in the fully latched position. Force shall be applied to the upper and lower edges of the door as close to the track as possible.

S4. *Test procedures.* Test procedures and equipment shall be in accordance with sections 4 and 5 of SAE Recommended Practice J839b and section 4 of SAE Recommended Practice J934.

[Federal Standard No. 515/6a]

ANCHORAGE OF SEATS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for automotive seat assemblies to prevent dislocation due to impact.

S2. *Application.* This standard applies to sedans, buses, including school buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, applicable references for this standard are: Federal Standard No. 515/1a, Anchorages for Seat Belt Assemblies in Automotive Vehicles; SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation; SAE Recommended Practice J879, Passenger Car Front Seat and Front Seat Adjuster; Uniform Vehicle Code of the National Committee on Uniform Traffic Laws and Ordinances; and Minimum Standards for School Buses of the National Education Association.

S3.2 *Definitions.*

S3.2.1 *School bus.* As defined in § 1-160 of the Uniform Vehicle Code, a school bus is: "Every motor vehicle that complies with the color and identification requirements set forth in the most recent edition of *Minimum*

Standards for School Buses,[1] and is used to transport children to and from school or in connection with school activities, but not including buses operated by common carriers in urban transportation of school children."

S3.2.2 *Automotive vehicle seat.* An automotive vehicle seat is a structure provided to seat the driver and passengers.

S3.2.3 *Seat frame.* The seat frame is the structural portion of a seat assembly.

S3.2.4 *Upper crossbar.* The upper crossbar is the uppermost horizontal member of a seat back frame.

S3.2.5 *Seat adjuster.* The seat adjuster is the device anchored to the vehicle structure which supports the seat frame and provides for seat adjustments. This includes any track, link, or power actuating assemblies to adjust the seat position.

S3.3 *Requirements for front seats.*

S3.3.1 *Adjustable seat frame combinations.* Each combination of seat adjuster and seat frame, with attachments, shall be constructed and anchored to the vehicle structure to withstand a horizontal forward and rearward static load equal to a minimum of 20 times the weight of the fully trimmed seat. Each seat back frame shall withstand a rearward (in relation to the seat) movement about the "H" point (see SAE Standard J826) of at least 3,300 inch-pounds for each designed seating position. The required load or loads for each designed seating position shall be applied simultaneously to the seat back frame upper crossbar at the vertical centerline of each seating position.

S3.3.2 *Fixed seat frame combinations.* Each nonadjustable seat frame combination, with attachments, shall be constructed and anchored to the vehicle structure to withstand a horizontal forward and rearward static load equal to a minimum of 20 times the weight of the fully trimmed seat. Each seat back frame shall withstand a rearward (in relation to the seat) moment about the "H" point (see SAE Standard J826) of at least 3,300 inch-pounds for each designed seating position. The required load or loads for each designed seating position shall be applied simultaneously to the seat back frame upper crossbar at the vertical centerline of each seating position.

S3.3.3 *Folding seat back frames.* Each seat back frame which folds over the seat shall be equipped with a releasable, self-locking, restraining device or devices. The lock release shall be located so as to be readily accessible to all occupants to permit egress by rear seat passengers. The locking device shall be designed and located to minimize the possibility of accidental release in a collision. It shall prevent the seat back frame from folding forward under a horizontal static load equal to a minimum of 20 times the weight of the fully trimmed seat back frame with the frame in locked position. It shall withstand a rearward moment about the "H" point (see SAE Standard J826) of at least 3,300 inch-pounds for each designed seating position. The required load or loads for each designed seating position shall be applied simultaneously to the seat back frame upper crossbar at the vertical centerline of each seating position.

S3.3.4 *Pedestal seats.* Pedestal mounted seats which pivot forward shall be equipped with releasable, self-locking, pedestal restraining device or devices. The restraining device or devices shall prevent the seat assembly from tilting forward under a horizontal static load equal to a minimum of 20 times the weight of the fully trimmed seat and pedestal. The load shall be applied with the seat pedestal in a locked position and at the level of the center of gravity of the assembly.

S3.4 *Requirements for intermediate and rear seats.*

S3.4.1 *Forward and rearward facing fixed seat frame combinations.* Each combination, with attachments, shall be constructed and anchored to the vehicle structure to withstand the loads specified in S3.3.2.

S3.4.2 *Forward and rearward facing detachable seat frame combinations.* Each combination, with attachments, shall be constructed and anchored to the vehicle structure to withstand the loads specified in S3.3.2.

S3.4.3 *Longitudinally mounted seat frame combinations.* Each combination, with attachments, shall be constructed and anchored either permanently or by detachable fittings, to the vehicle structure to withstand a horizontal forward and rearward (in relation to the vehicle) static load equal to a minimum of 20 times the weight of the fully trimmed seat.

S3.4.4 *Folding seats.* Seats which pivot forward on their forward attachment to the vehicle structure shall be equipped with a releasable, self-locking, restraining device or devices. The lock release shall be located so as to be readily accessible to all occupants to permit egress by passengers. The locking device shall be designed and located to minimize the possibility of accidental release in a collision. It shall prevent the seat from folding or displacing under a horizontal static load equal to a minimum of 20 times the weight of the fully trimmed seat.

S3.4.5 *Folding seat back frames.* Folding seat back frames of intermediate and rear seats shall conform to the requirements of S3.3.3.

S3.5 *Seats designed to provide seat belt anchorages.*

S3.5.1 *Sedans, carryalls, station wagons, buses, and light trucks up to 10,000 pounds G.V.W.* Seat frames and seat back frames designed to provide anchorages for seat belts shall be constructed and anchored to the vehicle structure which supports them in a manner to withstand, in addition to the forces already prescribed, a forward static load equal to a minimum of 2,500 pounds for each pelvic belt end attached or 3,000 pounds for each combination of pelvic and upper torso belt end attached.

S3.6 *Test procedures.* Testing of front seats shall be in accordance with the procedures set forth in SAE Recommended Practice J879. Testing of intermediate and rear seats shall be accomplished by applying similar procedures. Testing of seats designed to provide seat belt anchorage shall be in accordance with applicable procedures set forth in Federal Standard No. 515/1a. (NOTE: Some energy absorption under impact can be obtained through deflection of the seat back. Therefore, some deflection and permanent set of the seat back consistent with rigidity requirements and normal accommodations is permissible.)

* * * * * *

[Federal Standard No. 515/9a]

HYDRAULIC SERVICE BRAKE SYSTEMS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes minimum requirements for hydraulic service brake systems in automotive vehicles to insure braking ability after a component failure.

S2. *Application.* This standard applies to sedans, buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, applicable references for this standard are: Uniform Vehicle Code of the National Committee on Uniform Traffic Laws and Ordinances; SAE Recommended Practice J843a, Brake System Road Test Code—Passenger Car; and SAE Recommended Practice J937, Service Brake System Performance Requirements—Passenger Car.

S3.2 *Service brake system performance.* The performance ability of the fully operational service brake system for sedans and station wagons shall be not less than that described in section D of SAE Recommended Practice J937 and tested in accordance with the requirements of SAE Recommended Practice J843a. The performance ability of the fully operational service brake system for carryalls, buses, and light trucks up to 10,000 pounds G.V.W. shall be not less than that described in section 12-302 of the Uniform Vehicle Code.

S3.2.1 *Design.* The service brake system shall be designed so that rupture or failure of an actuating-pressure component will not result in complete loss of function of the service brakes. Mechanical linkage or other means of brake application may be utilized provided that continuation of the same motion on the normal system brake pedal applies or actuates this braking force. Actuating-pressure components are defined as, the brake master cylinder or master control unit, wheel brake cylinder, and brake line, brake hose, or equivalent. The hydraulic fluid system shall be sealed in a manner that provides protection of the brake fluid from outside contamination.

S3.2.2 *Partial system performance.* In the event of rupture or failure of an actuating-pressure component to any single brake, the partial system shall provide controlled stops without pulling or swerving to either side.

S3.3 *System effectiveness indication.* System effectiveness shall be indicated by an electrically operated red light mounted on the instrument panel. The light shall have an area of not less than 0.196 square inch. It shall illuminate before or upon application of the brakes when an actuating-pressure component of the system has sustained a loss of pressure. The indicator light system shall include a means for testing by the vehicle operator to assure that the light system is operable.

* * * * * *

[Federal Standard No. 515/12a]

WINDSHIELD WIPERS AND WASHERS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes minimum requirements for automotive vehicle windshield wiping and washing systems to provide optimum visibility in inclement weather.

S2. *Application.* This standard applies to sedans, buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W., with one-piece constructed windshields of the fixed type. Excluded are three-wheeled utility vehicles.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Recommended Practice J903a. Passenger Car Windshield Wiper Systems; SAE Recommended Practice J941, Passenger Car Driver's Eye Range; SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation; SAE Recommended Practice J942, Passenger Car Windshield Washer Systems.

S3.2 *Wiper system.* The wiper system shall consist of an apparatus for cleaning the exterior surface of windshield glazing and the necessary devices and controls to actuate and arrest operations. The windshield wiper system shall be driven by a motor or motors actuated by a conveniently located control by which the operator of the vehicle may vary the frequency or speed of the wiping cycle. The windshield wiper system shall be designed to provide two or more frequencies or speeds, and each frequency or speed shall be substantially con-

[1] Produced and sponsored by the National Commission on Safety Education of the National Education Association.

stant regardless of engine load. Wiper systems which utilize a timing device to interrupt at the end of each wiping cycle or several wiping cycles are acceptable if the timing device can be varied to provide continuous operation and two or more wiping frequencies of interrupted operation. Requirements not specified herein shall be in accordance with SAE Recommended Practice J903a.

S3.2.1 *Tests.* All tests for systems specified in S3.2 shall be in accordance with SAE Recommended Practice J903a.

S3.2.2 *Wiped area.* The requirements for minimum wiped area shall apply to sedans and station wagons only.

S3.2.2.1 The wiped area requirements are based on and established for high speed wiper operation, a wet windshield, and a minimum relative air speed of 70 miles per hour. The boundaries of the minimum wiped area shall be established on the windshield by planes originating from the 95th percentile tangential cut-off two-dimensional eye range contours in accordance with SAE Recommended Practice J941. With the driver's seat in the rearmost position, a glazing surface reference line and a plan view reference line shall be established. The glazing surface reference line (see figure 1) is the line of intersection of the glazing surface and a horizontal plane 25 inches above the "H" point, as defined in SAE Standard J826. The plan view reference line (see figure 2) is the line outboard of the steering wheel centerline and is parallel to the vehicle centerline at a distance 0.15 of the dimension from the steering wheel centerline to the left hand extremity of shoulder room. This dimension can be determined by taking 0.50 of the shoulder room dimension as indicated on figure 2, minus the distance from steering wheel centerline to centerline of car, and multiplying by 0.15 (see figure 2).

S3.2.2.2 The minimum wiped area requirements are defined by the use of three specific areas (A, B, and C) on the windshield glazing surface. Referring to figure 1, the upper and lower boundaries of each area shall be established by the intersection of two planes, tangent to the upper and lower sides of the eye range contour, with the windshield glazing surface. The planes shall be fixed by angles above (angle Y) and below (angle Z) the glazing surface reference line. Referring to figure 2, the left and right boundaries of each area shall be established by the intersection of two planes tangent to the sides of the left and right eye range contours. The planes shall be fixed by angles to the left (angle W) and right (angle X) of the plan view reference line. Table I provides the minimum angular dimensions that establish the boundaries for areas A, B, and C.

TABLE I

Area	Percent wiped area	Angles			
		Left ∠W degrees	Right ∠X degrees	Up ∠Y degrees	Down ∠Z degrees
	Minimums	*Minimums*	*Minimums*	*Minimums*	*Minimums*
A	80	18	56	10	5
B	95	14	53	5	3
C	100	10	15	5	1

S3.2.2.3 Area A is the largest specified portion of the windshield glazing surface, and no less than 80 percent of this area shall be cleanly wiped. Area B is a smaller area providing a broad horizontal band across the windshield glazing surface. Area B shall be cleanly wiped over 95 percent of its total area. These allowances are made in recognition of the geometry of modern wiper systems Area C, the smallest area directly in front of the vehicle operator, shall be cleanly wiped over 100 percent of its total area. In no instance shall there be an unwiped area at or near the horizontal center of the windshield produced by either a tandem or an opposed system which extends below the glazing surface reference line. The left windshield wiper blade shall, at any point, wipe to within 2 inches of the left corner "A" pillar.

S3.3 *Windshield washers.* The windshield washer system shall be provided with a 48-fluid-ounce-capacity container. The container shall be of material that will not crack or break if the fluid freezes. The fluid shall be applied to the outside of the windshield by vacuum pump or other method. The washer shall be actuated either manually or automatically.

S4. *Tests.* All tests for windshield washer systems shall be in accordance with SAE Recommended Practice J942.

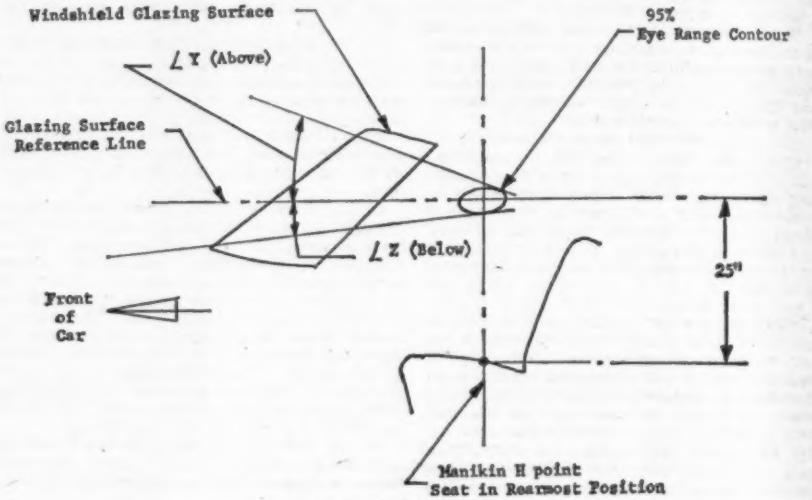


FIGURE 1.—Side view.

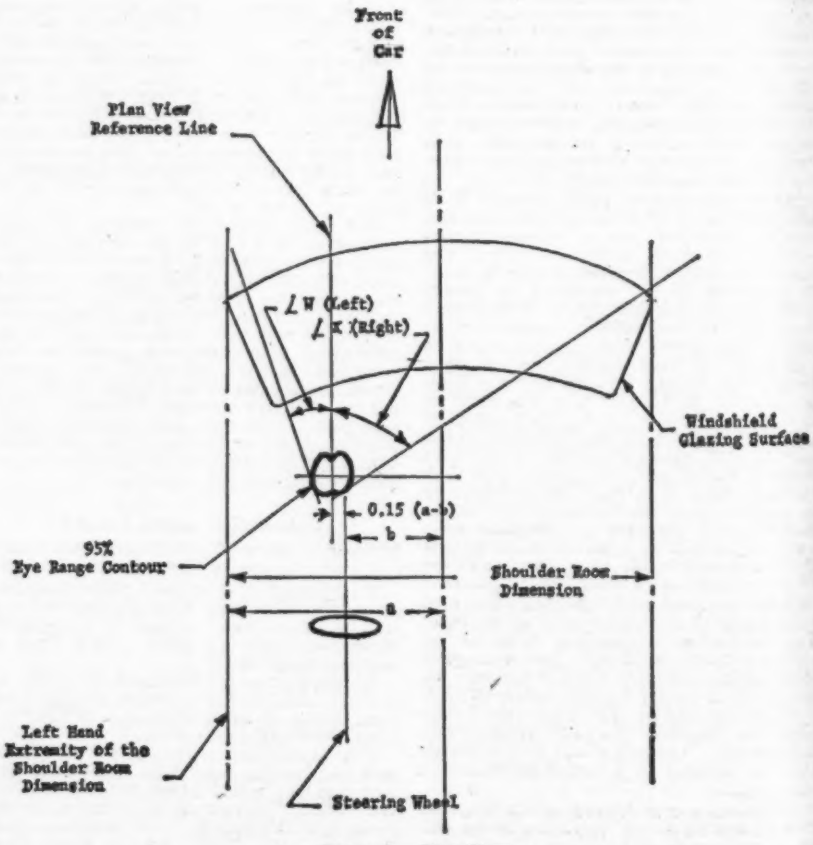


FIGURE 2.— Plan View

[Federal Standard No. 515/13a]

GLARE REDUCTION SURFACES FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes glare and reflection limits for vehicle components in the operator's field of view to achieve a practical reduction of distracting influences.

S2. *Application.* This standard applies to sedans, buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references to this standard are: ASTM Standards D 307–44, Method of Test for Spectral Characteristics and Color of Objects and Materials; D 523–62T, Method of Test for Specular Gloss; D 791–61T, Method of Test for Luminous Reflectance, Transmittance, and Color of Materials; D 1535–62, Method of Specifying Color by the Munsell System; and E 97–55, Method of Test for 45-Degree and 0-Degree Directional Reflectance of Opaque Specimens by Filter Photometry; and SAE Recommended Practice, J941, Passenger Car Driver's Eye Range.

S3.2 *Definitions.*

S3.2.1 *Field of view.* With the operator's seat in the rearmost position, the operator's field of view is the area forward of a lateral vertical plane which is located tangent to the rearmost boundary of the SAE 99th percentile eye range contour of SAE Recommended Practice J941 and extending to the area behind the "A" pillars back to the side windows. Behind the "A" pillars, glare reduction may be limited to bright metal surfaces around, inside, and outside adjacent to the windows of the vehicle. The area below the instrument panel is excluded.

S3.2.2 *Glare.* Glare is the visual effect of any source of light in the field of view that either dilutes or competes with the central attention signal on which attention is being focused.

S3.2.3 *Specular gloss.* Specular gloss is the luminous fractional reflectance of a specimen at the specular direction.

S3.2.4 *Luminous directional reflectance (Munsell value).* Luminous directional reflectance is the ratio of flux reflected to that from a perfect diffuse reflector similarly illuminated and viewed.

S3.2.5 *Saturation (Munsell Chroma).* Saturation (Munsel Chroma) is the attribute of color perception that expresses the degree of departure from gray of the same lightness. All grays have zero saturation.

S3.3 *Instrument panels.*

S3.3.1 The specular gloss of the surface of the material used for instrument panel top surfaces and appurtenances thereon which can produce glare in the windshield shall not exceed 30 units maximum, when measured by the 85° method in ASTM Standard D 523, or equivalent.

S3.3.2 The luminous directional reflectance of the surface of the material used for instrument panel top surfaces shall not exceed 30 percent (which is equivalent to a Munsell value less than 6.0/–), when measured as described in ASTM Standards D 307, D 791, D 1535, E 97, or equivalent.

S3.3.3 The saturation (Munsell Chroma) of instrument panel top surfaces shall be no more than /6, when measured as described in ASTM Standard D 1535, or equivalent.

S3.4 *Windshield wiper arms and blades.* The specular gloss of the surface of the material used for windshield wiper arms and blades in the operator's field of view shall not exceed 40 units maximum, when measured by the 20° method in ASTM Standard D 523, or equivalent.

S3.5 The specular gloss of the surface of the material used for instrument bezels, windshield molding, control devices, horn ring, inside and outside rearview mirrors and mounting hardware, trim hardware, etc., in the operator's field of view shall not exceed 40 units maximum, when measured by the 20° method in ASTM Standard D 523, or equivalent.

S3.6 Instruments, control devices, etc., shall be located so as to present a minimal reflection into the windshield under daylight and night driving conditions.

[Federal Standard No. 515/14a]

CONTROL OF AIR POLLUTION FROM AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for the control of emissions from new motor vehicles and new motor vehicle engines to minimize air pollution.

S2. *Application.* This standard applies to gasoline powered sedans, carryalls, station wagons, and light trucks with a design capacity up to and including ½ ton, or equivalent, equipped with engines of 50 cubic inch displacement, or over.

S3. *Standard requirements.*

S3.1 *Applicable references.* The applicable reference for this standard is Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines, 45 CFR Part 85, issued by the Department of Health, Education, and Welfare.

S3.2 All automotive vehicles and engines covered by this standard shall be equipped with either an integral or ancillary control system to provide control of emissions in accordance with the requirements set forth in the referenced regulations of the Department of Health, Education, and Welfare.

* * * * *

[Federal Standard No. 515/17a]

REARVIEW MIRRORS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for rearview mirrors for automotive vehicles to provide the driver with a clear, undistorted and reasonably unobstructed view of unit magnification to the rear under day and night operating conditions.

S2. *Application.* This standard applies to sedans, buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W. Vehicle bodies designed without rear windows, vehicles that require more than one outside mirror, and truck-type vehicles with small rear windows are accepted from the requirement for an inside rearview mirror.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Recommended Practice J941, Passenger Car Driver's Eye Range, SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation and SAE Recommended Practice J964, Test Procedure for Determining Reflectivity of Rear View Mirrors.

S3.2 *Inside rearview mirrors.*

S3.2.1 *Size.* The inside rearview mirror shall have a horizontal dimension which will provide the driver a view to the rear of the vehicle with a horizontal angle of no less than 20°. The vertical angle of rear vision shall be at least sufficient to provide a view of the road surface beginning at a point not greater than 200 feet to the rear of the vehicle, and continuing to the horizon under conditions of a level road and with the vehicle occupied by the driver and 4 passengers in the case of sedans, carryalls, and station wagons or loaded to gross vehicle weight in the case of buses and light trucks.

S3.2.2 *Location.* The rearview mirror shall be mounted on the inside of the vehicle to provide the driver with a stable image under normal road conditions. It shall be located as far forward along the longitudinal axis of the vehicle as the windshield, mount, and adjusting device will permit (buses excepted) and above the upper 95th percentile tangential cutoff of the eye range contour as defined in SAE Recommended Practice J941. Deviations in vertical positioning will be permitted when required to meet the vertical field of view requirements to the rear (S3.2.1). Extra large bus mirrors designed to serve an additional purpose of passenger surveillance shall be located with due consideration of the preceding requirements.

S3.2.3 *Mounting.* The mirror mounting shall provide a stable support for the mirror and shall be designed to minimize injury potential to occupants wearing pelvic restraints. The rim of the mirror or its supporting bezel shall have an edge radius of not less than 0.125 inch unless constructed of force distributing materials. The mount shall provide for universal adjustment of the mirror to accommodate any size driver in any available seat position. The mount, if in the impact area as defined following, shall be designed to break away, deflect away or collapse upon the application of a force not exceeding 90 pounds, from any direction. Rigid mounts shall break without leaving protruding residuals. Establish the head impact area using a manikin restrained by a type 1 seat belt assembly or other test device having "H" point (see SAE Standard J826) to "top-of-head" dimension of 33 inches and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated 29-inch device. The head impact area is the area between the arcs formed by the "top-of-head" points with the device placed at each designed seating position and then swung forward and 45° to each side of the longitudinal axis.

S3.3 *Outside mirrors.*

S3.3.1 *Size.* Circular mirror reflecting surfaces shall have a minimum nominal diameter of 5 inches. Rectangular or semirectangular mirrors shall have a minimum nominal horizontal dimension of 5 inches and a vertical dimension which provides the driver a view of the road surface beginning at a point not more than 35 feet to the rear and continuing to the horizon on a level road under all load conditions. The 35 feet shall be measured from the forward position of the 95th percentile tangential cutoff of the eye range contour as defined in SAE Recommended Practice J941 to the reflecting surface, then to the roadway to the rear of the vehicle.

S3.3.2 *Mounting.* The outside rearview mirror shall be located on the left outside of the vehicle and shall provide the driver with a stable image under normal road conditions. It shall not require more than 60° combined head and eye movement. Buses utilizing conventional truck chassis shall be permitted a combined head and eye movement not exceeding 90°. The mirror shall not be obscured by the unwiped portion of the windshield or by the corner pillar. It shall be readily adjustable to accommodate different size drivers, seat positions, and load conditions, and shall provide the operator a view of the side of the vehicle on which mounted. The mirror and mount shall be designed, constructed, located, and mounted to minimize pedestrian injury potential.

S3.3.3 *Additional outside rearview mirror.* Station wagons, carryalls, buses, and trucks shall be provided with an additional outside rearview mirror to provide driver vision to the right rear areas adjacent to the vehicle. Design, construction, location, and mounting of the right outside mirror shall be symmetrical to the left outside mirror, except that where necessary, the restriction on head and eye movement may be relaxed and consideration may be given to location and mounting problems dictated by vehicle design.

S3.3.4 *Wide angle mirror.* When specified, an auxiliary wide angle adjustable (convex) mirror may be incorporated in the same mount as the standard mirror to provide an additional close-in field of vision required under certain operating conditions. The auxiliary mirror shall not interfere with the visual field of the standard mirror.

S3.4 *Mirror construction.* The reflective medium shall resist abrasion and erosion incident to accepted cleaning practices. The mirror shall be finished to provide and maintain a distortion free reflected image. Front or second surface reflectance may be used. The reflectance value of the reflective film employed shall be not less than 50 percent. Inside mirrors may be of the selective position prismatic type, in which case the reflectance value in the night driving, high-glare position shall be not less than 4 percent.

4. *Test procedures.* The inside and outside rear view mirrors shall be tested in accordance with SAE Recommended Practice J964 with the reflectance value minimum as specified S3.4.

[Federal Standard No. 515/18]

WINDOW AND DOOR CONTROLS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes the requirements for the location and construction of the controls for windows and doors to afford a reasonable degree of protection for each occupant wearing a type 1 seat belt assembly.

S2. *Application.* This standard applies to sedans, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation, and Public Health Service Publication No. 1000, Series 11, Number 8, Weight, Height, and Selected Body Dimensions of Adults.

S3.2 Controls shall be constructed, located, or mounted to minimize the likelihood of injury to the head, torso, and legs of each occupant restrained by a type 1 seat belt assembly.

S3.3 *Impact areas.* SAE Standard J826 forms a basis for that part of this standard pertaining to head, knee, and leg impact areas. Establish the head impact area using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point to "top-of-head" dimensions of 33 and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated 29-inch device. The head impact area is the area between the arcs formed by the "top-of-head" points with the devices placed at each designed seating position and then swung forward and at least 90° to each side of the longitudinal axis or as far as the vehicle body structure will permit. Establish the knee and leg impact areas on the doors by swinging the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit with the seat in its rearmost position using manikins restrained by a type 1 seat belt assembly with leg dimensions of the normally seated 95th percentile male defined in Public Health Service Publication No. 1000, Series 11, Number 8 or other test device. To determine impact areas in all portions of the windows and doors that may be contacted, swing the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit at each outboard designed seating position with the manikin's "H" point moved horizontally forward 10 inches and its feet resting in their normal toe board position.

S3.4 *Location and construction.*

S3.4.1 The controls shall be located within reach of the pelvic belted occupant nearest the door. Controls shall be shielded, located away from the impact area, or recessed within the panel or armrest to minimize the likelihood of contact by pelvic belted occupants.

S3.4.2 Door handle controls not meeting S3.2 shall have a substantially vertical contact area not less than 2 square inches, with minimum edge radii of 0.125 inch. Window control knobs not meeting S3.2 shall have a substantially vertical contact area not less than 1 square inch, with minimum edge radii of 0.125 inch. All controls shall have a maximum extension from the panel of 1.0 inch except force distributing material covering the controls may extend beyond the 1.0 inch dimension.

S3.4.3 Controls not meeting S3.4.1 or S3.4.2 shall be constructed of material which will deflect within 1.0 inch of the panel or detach by a force of 90 pounds leaving no residual protrusion beyond the mounting surface.

[Federal Standard No. 515/19]

ASHTRAYS AND LIGHTERS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes the location and construction of ashtrays and lighters to afford a reasonable degree of protection for each occupant wearing a type 1 seat belt assembly.

S2. *Application.* This standard applies to sedans, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation, and Public Health Service Publication No. 1000, Series 11, Number 8, Weight, Height, and Selected Body Dimensions of Adults.

S3.2 Lighters and ashtrays in the open or closed position in the impact area, shall be located, constructed, or mounted to minimize the likelihood of injury to an occupant's head, torso, or leg upon impact. Ashtrays shall not be located in air streams which may scatter sparks.

S3.3 *Impact areas.* SAE Standard J826 forms a basis for that part of this standard pertaining to head, knee, and leg impact areas. Establish the head impact area using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point to "top-of-head" dimensions of 33 and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated 29-inch device. The head impact area is the area between the arcs formed by the "top-of-head" points with the devices placed at each designed seating position and then swung forward and at least 90° to each side of the longitudinal axis or as far as the vehicle body structure will permit. Establish the knee and leg impact areas on the doors by swinging the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit with the seat in its rearmost position using manikins restrained by a type 1 seat belt assembly with leg dimensions of the normally seated 95th percentile male defined in Public Health Service Publication No. 1000, Series 11, Number 8 or other test device. To determine impact areas in all portions of the instrument panel and doors that may be contacted, swing the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit at each designed seating position with the manikin's "H" point moved horizontally forward 10 inches and its feet resting in their normal toe board position.

S3.4 *Location and construction.*

S3.4.1 Ashtrays and lighters shall be shielded, located away from the impact area, or recessed to minimize the likelihood of contact by the head, torso, or legs of pelvic belted occupants.

S3.4.2 Open ashtrays and lighters not meeting S3.4.1 shall have a contact area of not less than 1.0 square inch in the direction of the impact and shall have minimum edge radii of 0.125 inch. Ashtrays and lighters shall either deflect or recede to within 0.375 inch of the mounting surface or be detached from the mounting by a force not exceeding 45 pounds.

[Federal Standard No. 515/20]

ARMRESTS FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for armrests to afford a reasonable degree of protection for front and rear seated occupants wearing type 1 seat belt assemblies.

S2. *Application.* This standard applies to sedans, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation; and Public Health Service Publication No. 1000, Series 11, Number 8, Weight, Height, and Selected Body Dimensions of Adults.

S3.2 Armrests shall be constructed and mounted to minimize force or spread the area of contact upon impact by an occupant.

S3.3 *Impact areas.* Establish the head impact area using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point (see SAE Standard J826) to "top-of-head" dimensions of 33 and 29 inches. Adjustable seats shall be in the extreme forward driving or riding position for the indicated 33-inch device and in the extreme rearward position for the indicated 29-inch device. The head impact area is the area between the arcs formed by the "top-of-head" points with the devices placed at each designed seating position and then swung forward and at least 90° to each side of the longitudinal axis or as far as the vehicle body structure will permit. Establish the knee and leg impact areas by swinging the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit with the seat in its rearmost position using manikins restrained by a type 1 seat belt assembly with leg dimensions of the normally seated 95th percentile male defined in Public Health Service Publication No. 1000, Series 11, Number 8, or other test device. To determine impact areas in all positions that may be contacted, swing the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit at each designed seating position with the manikin's "H" point moved horizontally forward 10 inches and with its feet resting in their normal toe board position.

S3.4 *Location and construction.*

S3.4.1 The innermost exposed surface of the armrests shall be substantially vertical. In any normal position of the seat, the substantially vertical surface of the armrest shall provide an area of broad contact with the pelvic region of not less than 2.0 inches vertically. The top and sides of the armrests shall be constructed of flexible material or covered with a minimum of 0.5 inch thick force distributing material. The armrests shall not have any sharp, narrow, or protruding rigid edges in the impact area either

exposed or under the force distributing material. The top and sides of the mounting bracket shall not have any rigid edges of less than 0.75 inch radius. If armrests break upon impact, no sharp or jagged edges shall remain.

S3.4.2 When constructed of flexible or foam-like material the material shall deflect to within 1.25 inches of the panel surface without permitting contact with any rigid material. Any rigid material between 0.5 and 1.25 inches from the panel surface shall have a minimum vertical height of not less than 1.00 inch. Upper and side edges of rigid material shall have a radius of not less than 0.75 inch.

S3.5 Accessories or equipment attached to the armrests shall meet the safety requirements applicable to such equipment or accessories and shall not nullify the injury reducing characteristics specified for armrests.

[Federal Standard No. 515/21]

PADDING FOR AUTOMOTIVE SEAT BACKS

S1. *Purpose and scope.* This standard establishes requirements for seat backs constructed to absorb and dissipate energy imparted upon impact by vehicle occupants. Also included for buses are the guardrail behind the driver's seat, the modesty panel and grabrail behind the service door(s), and applicable areas of vertical stanchions.

S2. *Application.* This standard applies to sedans, buses, including school buses, carryalls, station wagons, and light trucks up to 10,000 pounds G.V.W. with provision for forward facing rear seat passengers within the cab. Excluded are intra-city type buses.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, applicable references for this standard are: SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation; SAE Recommended Practice J921, Instrument Panel Laboratory Impact Test Procedure; Public Health Service Publication No. 1000, Series 11, Number 8, Weight, Height, and Selected Body Dimensions of Adults; Uniform Vehicle Code of the National Committee on Uniform Traffic Laws and Ordinances; and Minimum Standards for School Buses of the National Education Association.

S3.2 *Definitions.*

S3.2.1 *School bus.* As defined in § 1–160 of the Uniform Vehicle Code, a school bus is: "Every motor vehicle that complies with the color and identification requirements set forth in the most recent edition of *Minimum Standards for School Buses*,[1] and is used to transport children to and from school or in connection with school activities, but not including buses operated by common carriers in urban transportation of school children.

S3.3 The top and back of the front seats in sedans and trucks, the top and back of intermediate forward facing seats in carryalls and station wagons, and the tops and backs of forward facing seats in buses, shall be constructed of or covered with force distributing material to minimize force or spread the area of contact upon impact by an occupant. Rearmost and back-to-back seats are excluded.

S3.4 The guardrails, grabrails, modesty panels, and applicable areas of vertical stanchions shall contain no sharp or protruding areas and shall be constructed of or covered with minimum 0.5 inch thick force distributing cushioning material or other material that will reduce the likelihood of injury to the occupant upon impact.

[1] Produced and sponsored by the National Commission on Safety Education of the National Education Association.

S3.5 *Impact areas.* Establish the head impact area using manikins restrained by a type 1 seat belt assembly or other test devices having "H" point (see SAE Standard J826) to "top-of-head" dimensions of 33 and 29 inches. For school buses the "H" point to "top-of-head" dimensions shall be 33 and 21 inches. The head impact area is the area between the arcs formed by the "top-of-head" points with the devices placed at each designed seating position and then swung forward and at least 45° to each side of the longitudinal axis or as far as the vehicle body structure will permit. Establish the knee and leg impact areas by swinging the manikin's knees and legs 45° right and left or as far as the vehicle body structure will permit using manikins restrained by a type 1 seat belt assembly and with the "H" point moved horizontally forward 10 inches or other test devices with leg dimensions of the normally seated 95th percentile male defined in Public Health Service Publication No. 1000, Series 11, number 8.

S4. *Test procedures.* For test purposes, seat spacing in school buses shall be 27 inches. Spacing from the driver's guardrail to the front of the nearest seat cushion and from the modesty panel to the front of the nearest seat cushion, for test purposes, shall be 12 inches. Tests shall be in accordance with SAE Recommended Practice J921, except that the vertical plane of the impacting normally seated device while facing straight ahead shall be rotated 45° to the left and right. When impacting the seat back at 22 feet per second, the deceleration of the head form shall not exceed a maximum value of 80 g's, excluding all portions of the deceleration time curve above the 80 g level of less than 1.0 millisecond duration. The less than 1.0 millisecond time of duration shall be that measured at the 80 g level of the deceleration time curve.

[Federal Standard No. 515/22]

HEAD RESTRAINT FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes the requirements for front seat head restraints in passenger carrying vehicles to afford a reasonable degree of protection from neck injuries (whiplash) in the event of a rear end collision.

S2. *Application.* This standard applies to sedans and station wagons.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: Federal Standard No. 515/21, Padding for Automotive Seat Backs, and SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation.

S3.2 *Definition.*

S3.2.1 *Head restraint.* A head restraint is a padded device associated with a seat back for restraining rearward movement of the head.

S3.3 *General.* A head restraining device shall be provided for each outboard front seat position. The head restraint may be an extension of or attachment to the seat back. It may be provided with transversely adjustable mounting.

S3.4 *Requirements.*

S3.4.1 The minimum width of the head restraint at any lateral position shall be 10 inches and the average width shall be at least 12 inches. Both dimensions are applicable to the forward facing surface that can be contacted by the head of the occupant. The top of the head restraint, in its extreme up position if adjustable, shall be tangent to a plane which is perpendicular to the torso line of a two-dimensional manikin (see SAE Standard J826) and no less than 27.5 inches from the "H" point. The forward surface of the head restraint shall be no less than 1.0 inch and no more than 4.0 inches rearward of, measured on a perpendicular to, the torso line.

S3.4.2 The head restraint, including any supporting structures, shall meet the requirements of Federal Standard No. 515/21.

S3.4.3 Structural deflection of the head restraint resulting from contact in rear end collisions is allowable, except that rebound action shall be a minimum. The head restraint and its supporting structure shall not fail prior to failure of the seat back on which it is mounted.

[Federal Standard No. 515/23]

SIDE MARKER DEVICES FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for side marker systems to assure that vehicles will be visible in darkness from lateral positions.

S2. *Application.* This standard applies to sedans, carryalls, and station wagons.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Standard J592b, Clearance, Side Marker, Identification, and Parking Lamps; SAE Standard J594c, Reflex Reflectors; and Uniform Vehicle Code of the National Committee on Uniform Traffic Laws and Ordinances.

S3.2 *General.* The side marker system shall consist of an independent electrical system, an electrical system utilizing head and tail lamps, or any combination of these electrical systems or a reflective system, or any combination of electrical and reflective systems. As applicable, these requirements shall conform to Chapter 12 of the Uniform Vehicle Code of the National Committee on Uniform Traffic Laws and Ordinances. There shall be at least two devices on each side of the vehicle. One shall be mounted on each side near the front of the vehicle and one on each side near the rear no less than 16 inches nor more than 28 inches from the ground on an unloaded vehicle. Those near the front shall be white to amber and those near the rear shall be red. The side marker system components shall be visible under normal atmospheric conditions at any time lights are required. Both the front and rear side marker components shall be visible to approaching vehicles from a distance of at least 600 feet to within no less than 100 feet from the marked vehicle. Within this 100- to 600-foot range, the components shall be visible from all positions on each side beginning at the points where the headlights can just be seen continuing to the points where the taillights can just be seen.

S3.2.1 *Electrical side marker devices.* The electrical side marker devices shall be steady burning simultaneously with the head and taillights and parking lights. Photometric measurements shall be in accordance with Section J and Table 1, SAE Standard J592b and, as a minimum shall include test points encompassing the viewing angle described in S3.2.

S3.2.2 *Reflective side marker devices.* Photometric measurements for reflectors shall be in accordance with SAE Standard J594c, except that photometric measurements shall also include appropriate entrance angles encompassing the viewing angle described in S3.2. At entrance angles of over 20°, the photometric values shall be not less than for the 20° value stated in SAE Standard J594c.

S4. *Testing.* Tests shall be in accordance with SAE Standard J592b and SAE Standard J594c.

[Federal Standard No. 515/24]

REAR WINDOW DEFOGGER FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for rear window defogging to provide reasonable vision through the rear window.

S2. *Application.* This standard applies to sedans.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable reference for this standard is SAE Recommended Practice J953, Passenger Car Backlight Defogging System.

S3.2 The rear window defogging system shall be permanently installed and shall remove fog caused by atmospheric conditions and passenger load conditions from the inside glass surface.

S3.3 *Rear vision area.* The rear vision area to be cleared shall be in accordance with SAE Recommended Practice J953.

S4. *Testing.* Testing of the defogger system shall be in accordance with SAE Recommended Practice J953.

[Federal Standard No. 515/25]

ROLL BAR STRUCTURE FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements and test procedures for a roll bar structure installed on specific automotive vehicles to afford occupant protection in a rollover.

S2. *Application.* This standard applies to utility type light trucks up to 10,000 pounds G.V.W. with open bodies, which may have removable enclosures made of canvas, metal, wood, fiber glass, or plastic.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable references for this standard are: SAE Standard J826, Manikins for Use in Defining Vehicle Seating Accommodation and Recommended Practice J857, Roll-Over Tests Without Collision.

S3.2 *Roll bar structure.* The roll bar structure shall be constructed to protect operator and passengers in the vehicle. The strength and size shall provide maximum protection without critical encroachment on the operator or passengers. To the extent practicable, the roll bar structure shall be located to preclude contact by the heads of pelvic belted occupants or shall be covered with force distributing cushioning material at least 0.5 inch thick. It shall not impair the vehicle operator's vision or body movements while operating the vehicle. Unless otherwise specified, vehicle manufacturers may eliminate a fold-down windshield on the utility truck and incorporate a fixed windshield of adequate strength to serve as an element of the roll bar structure.

S4. *Testing.* Testing shall be in accordance with SAE Recommended Practice J857 using the ground level rollover and the ramp method at a speed of 50 miles per hour. After rollover, a three-dimensional manikin as specified in SAE Standard J826, with the head probe set at 33.0 inches above the "H" point, and all adjustable seats in extreme forward driving position, shall be used to gage the occurrence of any encroachment. There shall be no encroachment within the 33.0 inch established height for any designed seating position.

[Federal Standard No. 515/26]

FUEL TANKS AND TANK FILLER PIPES FOR AUTOMOTIVE VEHICLES

S1. *Purpose and scope.* This standard establishes requirements for the integrity and security of fuel tanks and tank filler pipes to prevent possible fire hazard.

S2. *Application.* This standard applies to sedans, station wagons, carryalls, and pickup trucks. Excluded are three-wheeled utility vehicles.

S3. *Standard requirements.*

S3.1 *Applicable references.* To the extent specified herein, the applicable reference for this standard is SAE Recommended Practice J850, Barrier Collision Tests.

S3.2 Fuel tanks (filled to rated capacity) and tank filler pipes shall be constructed and installed to insure against rupture, total displacement, or discharge of fuel from tank or filler pipe at a rate greater than one ounce per minute, when tested as specified in S4.

S4. *Test procedures.* A front end longitudinal barrier collision test shall be conducted as specified in SAE Recommended Practice J850 at 30 miles per hour. Rear end and side collision tests, directed at the centerline of the fuel tank, shall be made using a moving barrier device weighing a minimum of 4,000 pounds and propelled at 20 miles per hour for a rear end collision test and 15 miles per hour for a side collision test on each side of the vehicle. Other testing methods proven to give results equivalent to the SAE Recommended Practice J850 barrier collision test and the moving barrier tests may be used.

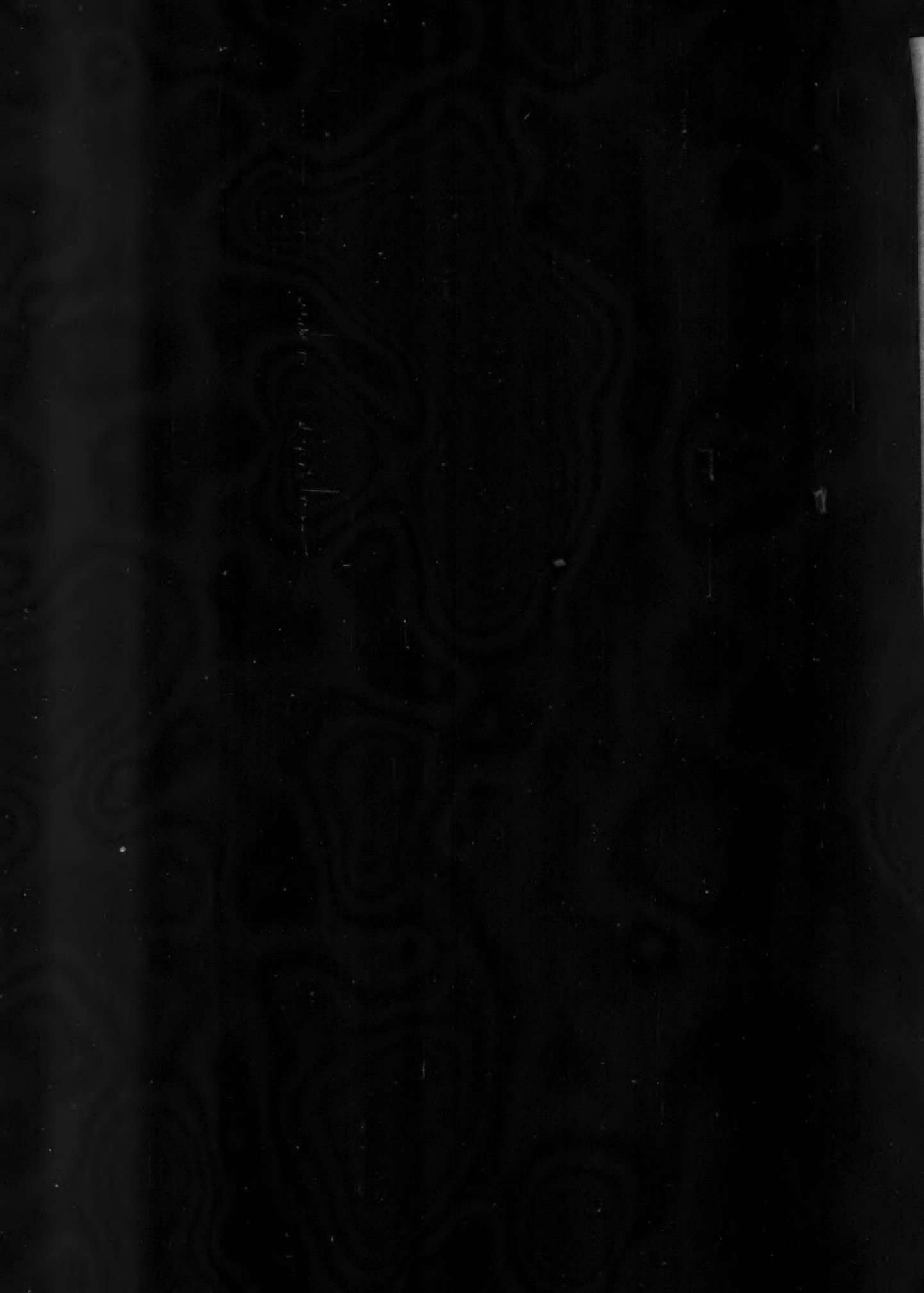
(Sec. 205(c), 63 Stat. 390; 40 U.S.C. 486(c); sec. 2, Pub. Law 88-515, 78 Stat. 696; 40 U.S.C. 702)

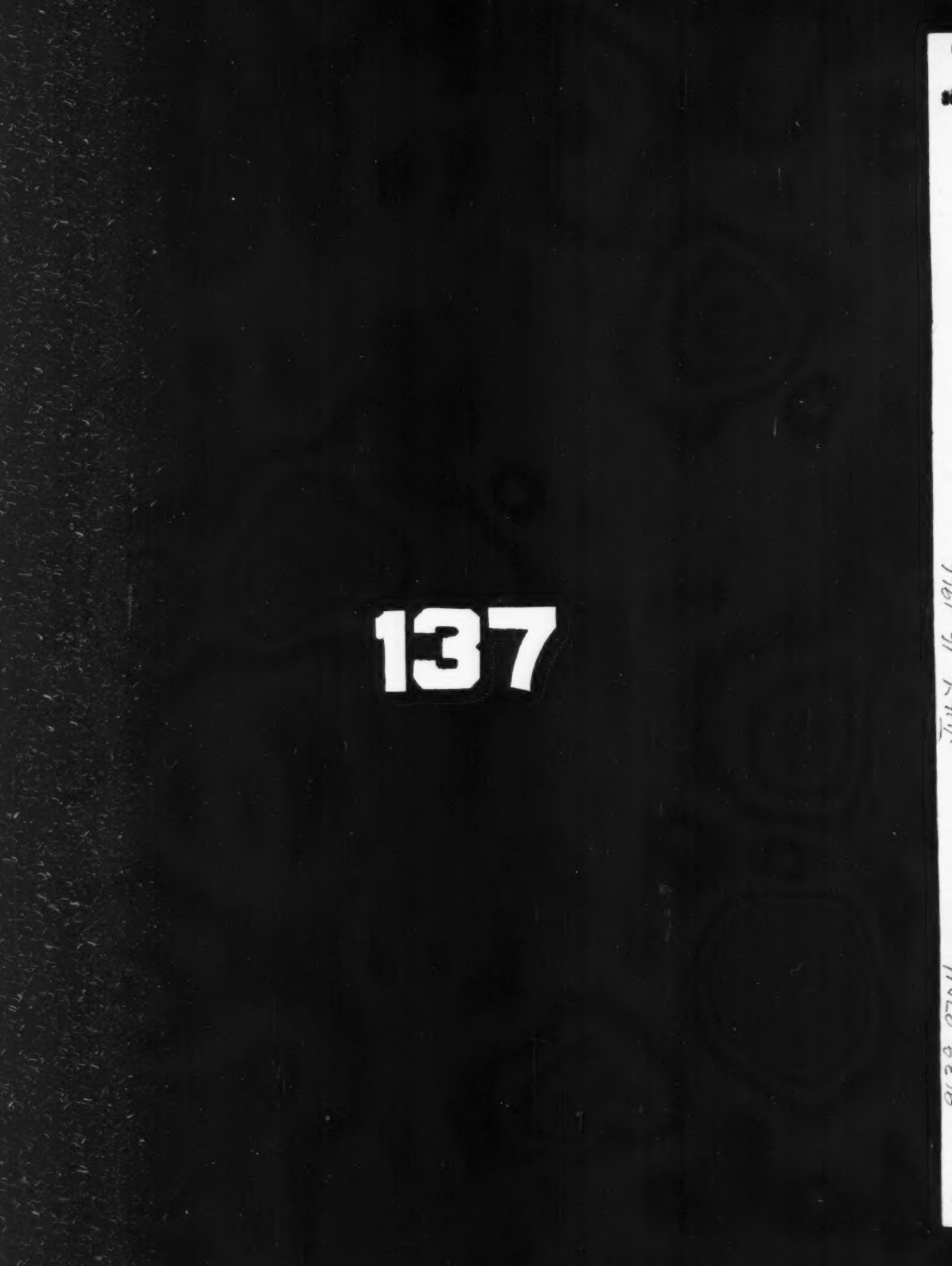
Effective date. This regulation is effective for automotive vehicles manufactured on or after October 13, 1967, but may be observed earlier. The effective date for the provisions of detailed standards which are not revised by this amendment will remain September 28, 1966.

Dated: July 14, 1966.

LAWSON B. KNOTT, Jr.
Administrator.

[F.R. Doc. 66-7794; Filed, July 14, 1966; 11:05 a.m.]




137

US.N21f

ROOM

DETROIT PUBLIC LIBRARY JUL 20 1966

SOCIOLOGY & ECONOMICS

FEDERAL REGISTER

VOLUME 31 • NUMBER 137

Saturday, July 16, 1966 • Washington, D.C.

Pages 9639–9704

JULY 16, 1966

9639-9704

Agencies in this issue—

Agricultural Stabilization and Conservation Service
Agriculture Department
Civil Aeronautics Board
Civil Service Commission
Commodity Credit Corporation
Consumer and Marketing Service
Federal Aviation Agency
Federal Maritime Commission
Federal Power Commission
Federal Reserve System
Federal Trade Commission
Food and Drug Administration
Geological Survey
Interior Department
International Commerce Bureau
Interstate Commerce Commission
Post Office Department
Public Health Service
Securities and Exchange Commission
Wage and Hour Division

Detailed list of Contents appears inside.

THE NATIONAL ARCHIVES OF THE UNITED STATES • 1934 •